

A diver in a blue wetsuit and yellow fins is underwater, holding a tablet. Bubbles are visible in the background. The diver is positioned horizontally, facing right, with a scuba tank on their back. They are holding a tablet in their right hand and a yellow marker or tool in their left. The background shows a deep blue ocean with some coral and a white buoy in the distance.

Marine Reserves Research & Monitoring Workshop

Gary E. Davis
— **Visiting Chief Scientist**
Ocean Programs
Washington, D.C.

Workshop Outcomes & Products

- ✓ Improved understanding of Caribbean marine reserve experiences
- ✓ Network of MPA professionals
- ✓ Ideas and framework for research and monitoring plans for US Virgin Islands parks



1-Minute Introductions

- ✓ Name: *Gary Davis*
- ✓ Affiliation: *US National Park Service*
- ✓ Profession: *Coach & cheerleader*
- ✓ MPA experience: *USVI, FL Keys & California Channel Islands*
- ✓ Workshop goal: *Learn from others' experiences to improve park management*



74 Ocean Parks in the National Park System

- 35 million acres of prime coastal habitats
- 5,100 miles of shoreline
- 40 parks include 3.2 million acres of ocean and submerged lands adjacent to park watersheds
- 26 States & Territories—diverse landscapes
- Diverse ecosystems—arctic, temperate, tropical, estuaries, beaches, rocky shores, kelp forests, coral reefs



Ocean National Parks & Monuments

Acadia

American Samoa

Biscayne

Buck Island Reef

Cabrillo

Channel Islands

Dry Tortugas

Everglades

Glacier Bay

Olympic

Redwood

Virgin Islands



National Seashores

Assateague Is
Canaveral
Cape Cod
Cape Hatteras
Cape Lookout
Cumberland Is
Gulf Islands
Fire Island
Padre Island
Point Reyes



Coastal National Recreational Areas

Boston Harbor
Islands

Gateway

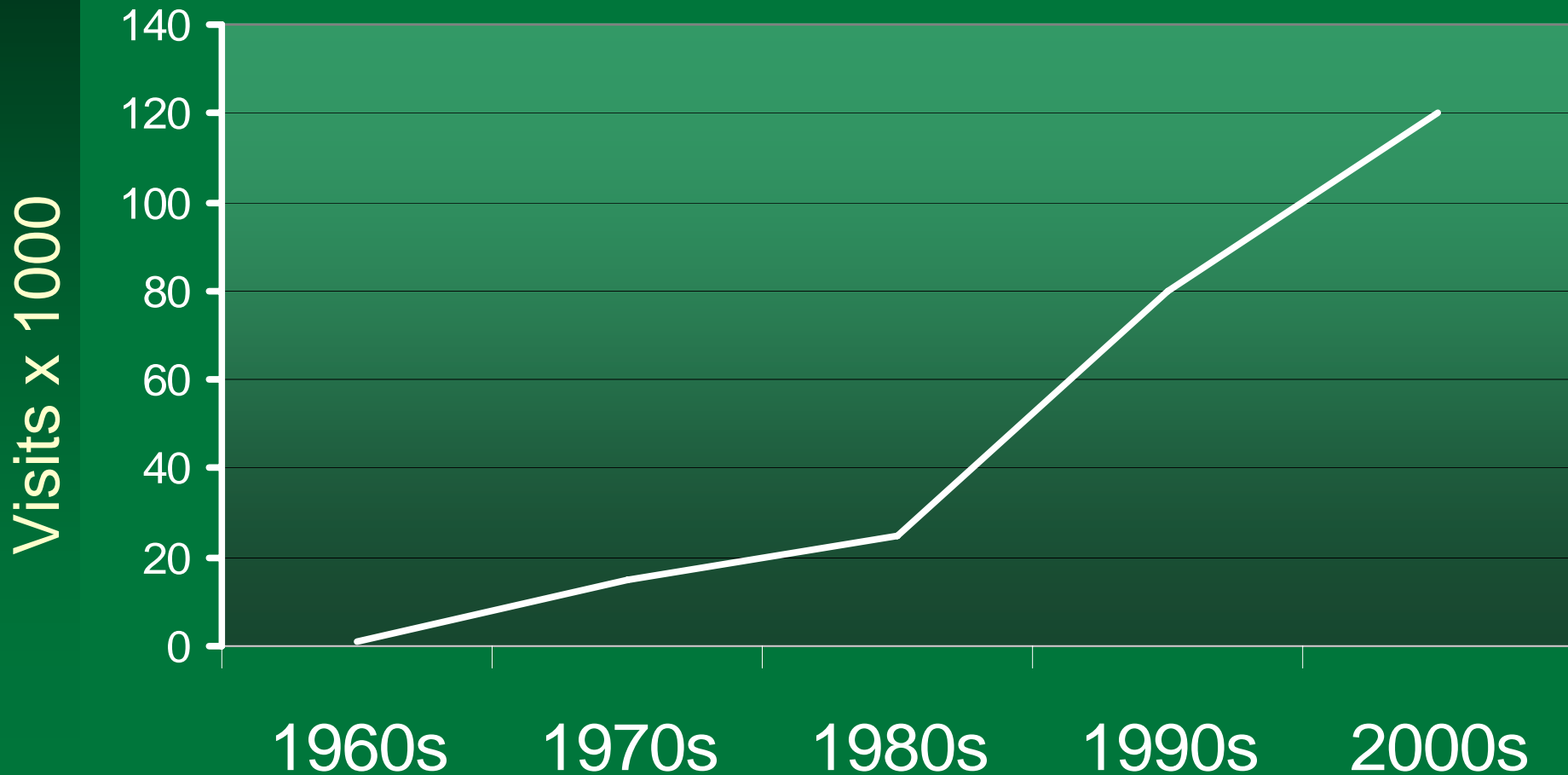
Golden Gate

Santa Monica
Mountains



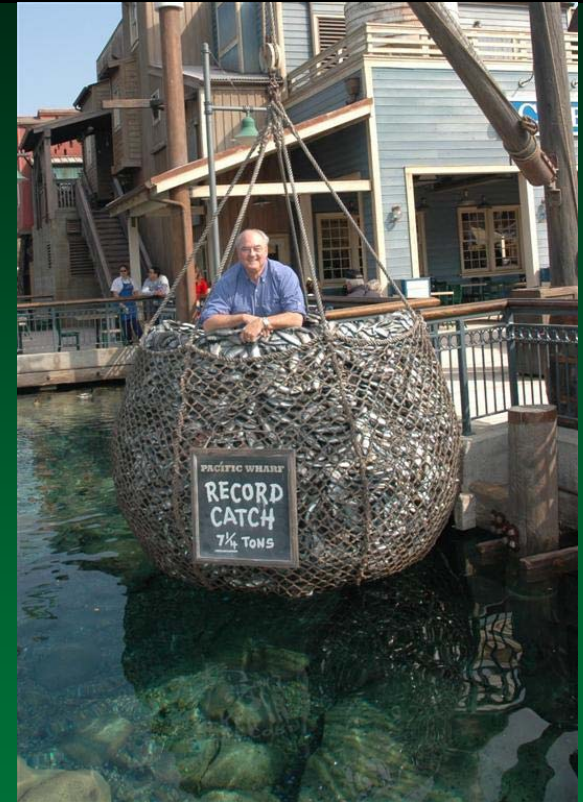
Demand for Ocean Parks Increasing

Dry Tortugas National Park, Florida



Marine Ecosystems in Parks Face Same Threats as Terrestrial Ecosystems in Parks

- ✓ Habitat fragmentation
- ✓ Pollution
- ✓ Human disturbance
- ✓ Invasive species

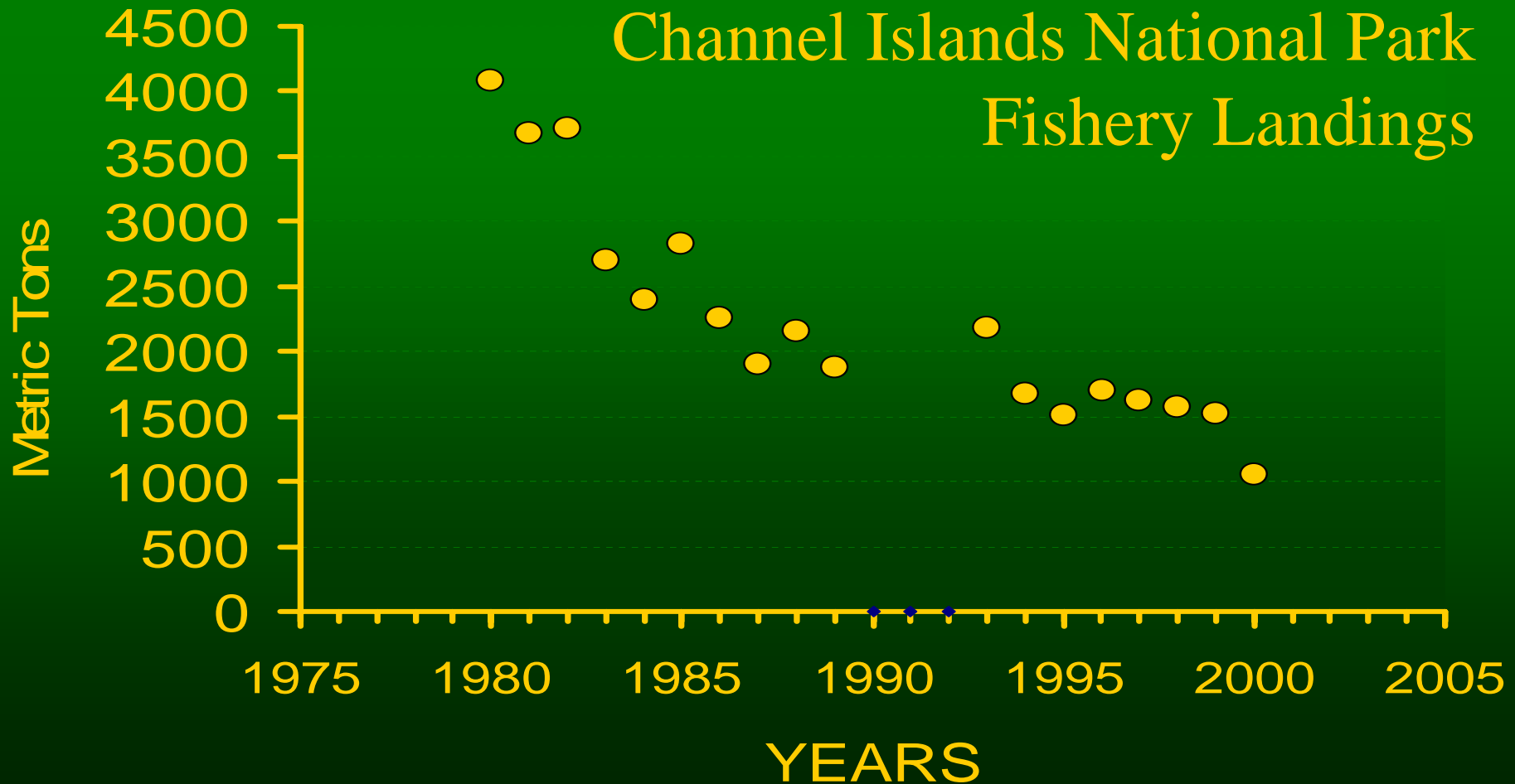


Ocean Parks Also Face Direct
Resource Extraction—Fishing

Illusions of Protection

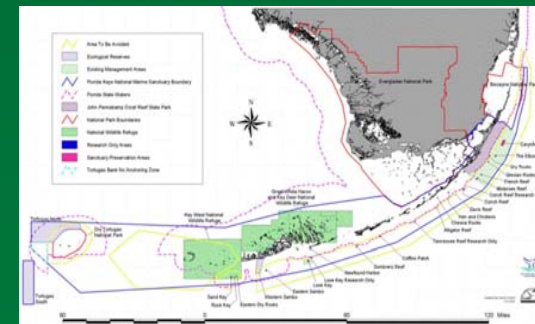
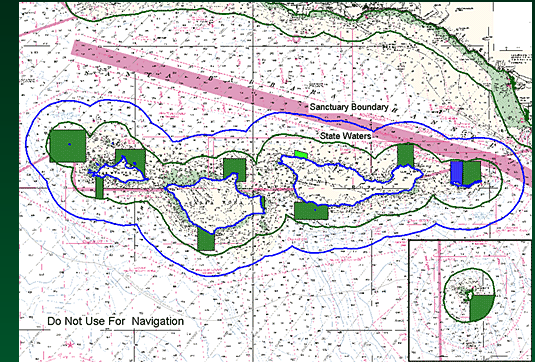
- ✓ Thousands of MPAs around the world
 - 1,500 in U. S. waters (275 west coast=47%)
 - Nearly all allow fishing (0.04% no fishing)
- ✓ Fisheries in parks failed
 - Impaired fishing opportunities
 - Species at risk
 - Ecosystems shifted from stable, diverse, complex, productive systems to unstable, simple, low productivity systems

Parks Were Last Best Places to Fish & Best Opportunities for Restoration



Marine Reserves Recently Established in Parks

- Buck Island Reef NM, USVI—7,627 ha
- Virgin Islands Coral Reef NM, USVI—5,145 ha
- Channel Islands NP, CA—45,051ha (10 reserves)
- Dry Tortugas NP, FL—11,919 ha (+51,536 ha in two adjacent reserves)
- Glacier Bay NP & P, AK—140,000 ha (commercial)



New Opportunities

- ✓ Now possible to isolate effects of fishing from those of other stressors, e.g., global change, pollution, coastal development and disturbance
- ✓ Formerly difficult to differentiate effects of various stressors—because fishing occurred everywhere
- ✓ New fishing regulations are conducting an experiment with parks as dynamic controls



Rare Opportunity

- ✓ Conduct landscape scale, experimental ecology and conservation science research
- ✓ Explore new conservation strategies to:
 - rebuild and sustain fisheries
 - test optimum designs for place-based ocean conservation
 - complement species-based strategies



NPS needs more information on:

- ✧ Basic ecosystem structure and functioning
- ✧ Connectivity at a variety of scales
- ✧ Cause and consequence relationships
- ✧ Predictive tools for strategic conservation planning

to move conservation practice
beyond treating symptoms to
addressing causes.

Specific Research Questions

- ✓ How does reserve protection affect fish assemblages and other exploited and ecologically significant organisms?
- ✓ How does fishing affect the effects of other ecosystem stressors ?
- ✓ How is ecosystem integrity related to disease and coral bleaching events?
- ✓ How are changes in fish assemblages related to changes in benthic communities, e.g., coral cover and kelp canopy?

Specific Research Questions (cont.)

- ✓ How are inshore areas ecologically connected to adjacent offshore areas?
- ✓ How do protected nursery areas affect adjacent fisheries and ecosystems?
- ✓ How are the new reserves connected regionally to fisheries and other reserves?
- ✓ How does ecosystem integrity influence key processes, e.g., calcification, herbivory, productivity, and recruitment?

Current NPS Vital Signs Monitoring in Marine Reserves

- ▼ coral communities
- ▼ aquatic vegetation
- ▼ other benthic communities
- ▼ marine fish communities
- ▼ exploited fishes
- ▼ goliath grouper
- ▼ red hind
- ▼ lemon & bull sharks
- ▼ nurse shark
- ▼ gray snapper
- ▼ Schoolmaster
- ▼ pink shrimp
- ▼ spiny lobster
- ▼ oysters
- ▼ sea turtles
- ▼ marine mammals
- ▼ threatened species—
Acropora, Diadema

Workshop Purposes

- ✔ Share experiences with marine reserves* research, monitoring & management
- ✔ Identify opportunities for research and monitoring of new reserves

* An MPA in which extractive uses are prohibited



Discussion Topics

- ✦ What are the outcomes of marine reserve designations?
- ✦ How do connectivity and other factors influence performance of marine reserves?
- ✦ How can the effects of marine reserves be measured, monitored, and evaluated?

Connectivity

- ✓ Scales—time and space
- ✓ Ecological—food web, competition
- ✓ Geographical—ocean currents
- ✓ Natural history—larval dispersal, habitats
- ✓ Social—people to nature, human communities
- ✓ Economic—fisheries, tourism



Workshop Format—Balance Talking & Listening

- ✓ Four Discussion Topics
 - MPA goals & expectations
 - Connectivity
 - Reserve research & monitoring
 - Next steps—research & monitoring plans
- ✓ Panel presentations (3-4) & discussion
- ✓ Breakout group (8-10) discussions
- ✓ Plenary reports from breakouts—
recommend research & monitoring

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